

ONLINE WITH IOWATER MONITORS

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Joost Korpel is an information technology specialist with Iowa's Water Monitoring Program. He received his master's degree in geology from the University of Iowa, and has worked in Iowa state government for 19 years in various roles including systems analyst, research geologist, geographic information specialist, and IT network administrator. Joost provides expertise in both geology and IT data management (including the IOWATER database and Iowa's STORET database) to the Water Monitoring Program.

Bill Bunker has been a research geologist with the Iowa Department of Natural Resources – Geological Survey for 31 years. Bill conducts field investigations and computer applied research to the stratigraphic sequence in Iowa, with special emphasis on the Devonian and Mississippian Systems. Bill developed and maintains GEOSAM, the computerized inventory of rock chip cuttings and core library, and the geological and lithological dataset for the Geological Survey Bureau.

Jack Gilmore has worked for the Iowa Department of Natural Resources – Geological Survey for 24 years. He oversees the laboratory preparation of rock materials, maintains a computerized inventory of drill cuttings, drill core, and outcrop samples, and provides retrieval services for access to drill cuttings and rock cores.

ABSTRACT

IOWATER, Iowa's citizen water monitoring program, provides Iowans the opportunity to take an active role in protecting and restoring Iowa's waters. The program is flexible, allowing individuals and groups to design their own monitoring plans. Citizen monitors can submit data to a central online database (www.IOWATER.net) that is password protected. Only trained IOWATER monitors can register monitoring sites and submit data. Anyone, however, can view the data.

IOWATER monitors use the Iowa Geographic Image Map Server to determine geographic coordinates for their monitoring sites from U.S. Geological Survey topographic maps. Online assessment forms, designed to look like the field assessment forms, are used to submit data for biological, chemical/physical, and/or habitat assessments. Drop down boxes minimize typing and the chance for data entry error. Digital photos of monitoring sites also can be uploaded into the database. These GIF or JPEG files provide visual documentation of stream conditions.

Information in the IOWATER database can be queried by site, county, watershed, or geographic area. ArcIMS™ is used to geographically display monitoring sites and access data. ArcIMS™ is an Internet mapping application that allows GIS (Geographic Information System) data to be delivered to an individual's desktop. The user can identify information about different layers of geographically referenced data and create a map based on the various layers of information.

Since June 2000 when the IOWATER database first went online, 815 monitoring sites have been registered, 3,700 data records submitted, and more than 200 digital images uploaded to the database. The IOWATER online database was developed by staff within the Iowa Department of Natural Resources – Geological Survey at an estimated cost of \$78,000.

INTRODUCTION

IOWATER is Iowa's citizen monitoring program. Its mission is "To protect and improve Iowa's water quality by establishing and supporting a statewide volunteer water monitoring program." When it comes to volunteer monitoring, an organized statewide program is relatively new to Iowa. Individual volunteer monitoring efforts have existed in Iowa for a number of years, varying from school teachers incorporating water testing as part of their classroom activities to individuals and groups participating in the Izaak Walton League's Save Our Stream program. But no official, state-sponsored program was available until May 1998.

In 1999, IOWATER underwent a number of significant changes. IOWATER became part of Iowa's Ambient Water Monitoring Program; Rich Leopold was hired as the IOWATER Coordinator; additional organizations and governmental agencies became members of the IOWATER Advisory Committee; IOWATER took its show on the road with on-site trainings; the IOWATER manual was revamped; testing equipment was provided to volunteers trained in IOWATER; levels of training were developed; an online database was developed for IOWATER data; a quarterly newsletter, the *Iowa Citizen Monitor*, was initiated; an IOWATER website was established; and technical assistance provided by IOWATER staff. To date, more than 1,000 citizen monitors have been trained at 39 IOWATER Level 1 workshops held in 2000 and 2001. For more information on the IOWATER program, see Leopold (this volume). Current IOWATER staff includes the IOWATER coordinator (hired October 1999), an IOWATER field coordinator (January 2001), and an IOWATER Natural Resources Interpreter (March 2002).

SUPPORT FOR IOWATER AND MONITORING IN IOWA

Historically, Iowa has invested limited state monies to monitor its water resources. When IOWATER formed in 1998, initial funding for IOWATER was provided by the Iowa Department of Natural Resources, including federal Nonpoint Source Management funds through the U.S. Environmental Protection Agency (Section 319 of the Clean Water Act), and Sportfish Restoration Fund provided by the U.S. Fish and Wildlife Service and the Iowa Fish and Wildlife Trust Fund. Funding primarily supported hiring of IOWATER's first coordinator and development of the first IOWATER manual.

The 1999 Iowa Legislative Session marked a turning point in Iowa's water-monitoring history. For the first time, the state set aside a significant amount of money - one million dollars - to assess the condition of its water resources. This money, provided through Iowa's Infrastructure Fund, was used to support and greatly expand Iowa's Ambient Water Monitoring Program. State funding has increased to its current level of \$2.5 million. In addition to providing support for IOWATER and development of an online database (10% of funding supports the IOWATER program), the monies also support professional water-quality monitoring of Iowa's surface waters, lakes, state-owned beaches, biological monitoring (fish and benthic macroinvertebrates), and groundwater resources; implementation of STORET (STORage and RETrieval) as Iowa's statewide water-quality database and EDAS (Ecological Data Application System) as the statewide biological database; data analysis and interpretation; and public outreach. For information on Iowa's STORET in Iowa, see Skopec (this volume).

Not only did the Iowa Legislature provide financial support to IOWATER through the Ambient Water Monitoring Program, but Iowa Governor Tom Vilsack and Paul Johnson, then Director of the Iowa Department of Natural Resources, strongly supported and encouraged the involvement of Iowa citizens in monitoring and protecting their water resources. IOWATER provided a venue for citizen involvement.

LEVELS OF TRAINING

One of the many lessons IOWATER learned from other volunteer water monitoring programs is the need to offer different levels of training. Currently two levels of IOWATER training are available. Level 1, the introductory training for running waters, is a 10-hour workshop, generally completed over two days. Participants learn how to

conduct biological, chemical, physical, and habitat assessments. For the biological assessment, benthic macroinvertebrates are identified to the Order level, and estimates are made of the percentage of aquatic plant cover and algae cover of the stream or streambed. At Level One, only the presence/absence of these organisms is noted. The habitat assessment evaluates stream habitat type, stream bed substrate, microhabitats, stream bank conditions, percentage of canopy cover, riparian zone width, riparian zone plant cover, and adjacent land use. The chemical assessment includes weather conditions at the time of sampling, rainfall during the previous 24 hours, pH, nitrite-N, nitrate-N, orthophosphate, and dissolved oxygen. Physical parameters include water color and odor; stream width, depth, and velocity; as well as water temperature and transparency. Monitors are trained to test for more than 20 parameters. Upon completion of the Level 1 workshop, individuals are Level 1 certified. Everything the monitor is trained to do, he/she is equipped to do.

Individuals decide where to monitor, what parameters to monitor for, and the monitoring frequency. The question “why are you monitoring” often provides the answer to “what to monitor for” and “how often to monitor.” IOWATER recommends that biological assessments be conducted no more than three times a year, a habitat assessment be completed once a year unless there is a major land use change that occurs in the watershed, and a chemical assessment be done monthly to quarterly. The frequency of the chemical assessment is highly variable and dependent on the questions an individual or group is trying to answer through monitoring.

Level 2 workshops are offered for individuals interested in expanding their skills in water monitoring. Level 2 workshops are 8 hours in length. They include more information on how to design a monitoring program, what a Quality Assurance Project Plan (QAPP) covers and how to write one, data interpretation, and additional testing for chloride and *E. coli* bacteria.

In addition to the basic Level 2 workshop, a variety of 4-hour modules are offered. These modules cover standing waters, benthic macroinvertebrate indexing, and soil monitoring. For standing waters, many of the testing methods used for streams have been adapted for lake and pond monitoring. The benthic macroinvertebrate indexing module involves identifying benthic organisms to the Family level and counting the number of organisms present. Based on the number of organisms identified and the tolerance value of each organism, a number of metrics are calculated. The soil module includes measurements of soil nitrate, slake test or soil stability, soil infiltration, and residue cover. New modules for 2002 include a stream ecology module and a secondary educators module. To become a certified Level 2 IOWATER monitor, the 8-hour Level 2 workshop plus one 4-hour module of an individual's choosing needs to be completed.

DEVELOPMENT OF THE IOWATER ONLINE DATABASE

Although Iowa was not an early adopter of a statewide volunteer monitoring program, IOWATER benefited from the lessons learned by other volunteer water monitoring programs across the United States. Coordinators of other state volunteer water monitoring programs found management of volunteer data a time consuming endeavor, especially if the program coordinators were entering data into a central database. Access to data was another issue. Volunteers wanted to be able to see their data and to have their data available to others to use.

Since IOWATER had limited staff and resources at the time, it was decided to develop an online database to manage volunteer data. At the same time, the Water Monitoring Program staff was embarking on development of IASTORET (the modern version of STORET) which the Iowa Department of Natural Resources planned on installing locally and customizing to meet the management needs of Iowa's water quality data (see Skopec, this volume). The eventual goal with the IOWATER database is to merge the IOWATER data into STORET; initially, however, the two databases remain separate.

There are a number of reasons why staff of the Iowa Department of Natural Resources - Geological Survey were used to develop the IOWATER database: the staff would be involved with development of IASTORET and had familiarity with metadata needs (methods, equipment); staff had some experience with online databases; staff would likely be providing ongoing technical assistance to IOWATER monitors on the use of the database; staff

were most familiar with the field assessments being used in IOWATER; staff has extensive experience with GIS that could be used in the development of mapping applications; and staff responds well to challenges **AND** to chocolate chip cookies.

The online database allows trained IOWATER monitors to use the Internet to submit data to a central database. IOWATER monitors are not required to submit their data. Use of the data is left up to the individual. Table 1 lists the estimated cost to develop and maintain the IOWATER database. IOWATER decided that individuals collecting the data were the most qualified to submit the data. The database, available at the IOWATER website (www.IOWATER.net), went online June 1, 2000. The database is password protected so that only trained IOWATER monitors can register monitoring sites and submit data. Anyone, however, can view the data. At Level 1 workshops, participants are trained to use the IOWATER database, not only to submit their data, but to access data submitted by other monitors throughout Iowa. Upon completion of a Level 1 workshop, each individual is given an IOWATER monitor ID and password that is used to register sites and submit data.

The IOWATER database is an SQL server database located on a commercial server. The database is a series of tables linked by monitor ID or the monitoring site number. The database is backed up on a weekly basis. Front Page™ forms, created using Active Server Pages (ASP code), were used to generate the online forms to submit data.

Registering Monitoring Sites

IOWATER monitors determine what stream they will monitor and for what parameters. The IOWATER program uses UTM (Universal Transverse Mercator) coordinates to identify the location of monitoring sites. During IOWATER workshops, participants learn how to read a topographic map and UTM coordinates. The Iowa Geographic Image Map Server (<http://ortho.gis.iastate.edu/drg24/drg24.html>) is a website that provides all of the 1:24,000-scale U.S. Geological Survey topographic maps for Iowa in Digital Raster Graphics format. Citizen monitors use this website to generate UTM coordinates for their desired monitoring site(s). The individual selects the topographic map that includes his/her monitoring site by either selecting the topographic map by name, by a nearby state park, by watershed, or by directly clicking on an interactive map of Iowa. The UTM coordinates for any point on the map are generated by simply placing the cursor on the stream site and clicking. It is recommended that monitors zoom to the 2.4-meter pixel scale to generate UTM coordinates. The Iowa Geographic Image Map Server also provides digital orthophotographs that can be used to generate UTM coordinates. Pan symbols located around the edge of all maps provide easy navigation to adjacent maps. The maps can also be printed.

Use of the Iowa Geographic Image Map Server minimizes the chance for error in reading UTM coordinates directly from a topographic map and eliminates the need to purchase a topographic map. It also standardizes all UTM coordinates to one UTM zone and projects the UTM coordinates as NAD83 (North American Datum), rather than NAD27. Global Positioning System (GPS) units can be used to generate UTM coordinates, and monitors are advised to set their units to NAD83 rather than NAD27.

Once UTM coordinates are identified, an online site registration form is completed. The registration form includes the UTM coordinates for the site, why the site is being monitored, county where the site is located, site type (stream, lake, soil), site name chosen by the monitor, and a physical description of the site. Once the online registration form is submitted, a unique six-digit site number is assigned and entered into the IOWATER database, and the site location is verified using the appropriate county stream GIS coverage. The citizen monitor is then notified that data submittal can begin. Individuals can submit data only for sites registered. IOWATER uses a six-digit site number that begins with a 9 to indicate the site is an IOWATER site, followed by a two-digit county code, and a three-digit sequential number. IOWATER also has had a number of individuals from adjacent Minnesota counties participate in IOWATER. Many have registered monitoring sites in Minnesota on streams that flow into Iowa. These sites begin with the number "8."

Once sites are registered, the IOWATER site table is updated and converted to a GIS shapefile and joined with other GIS coverages. These coverages include the name of the 7.5' U.S. Geological Survey topographic map where the site is located and Hydrologic Unit Codes (HUCs) or watersheds, including the 8- and 10-digit HUCs, and will eventually include the 12-digit HUCs when completed. The HUCs allow the IOWATER database to be searched by watershed.

Data Submittal

Once a site is registered, data can be submitted to the database by logging in to the database using the monitor's assigned IOWATER monitor ID and password (Figure 1). A drop down box will appear that lists the site(s) registered by that particular monitor. A site is selected and an online assessment form chosen to enter data. Online assessment forms, designed to look like the field assessment forms, are then used to submit data for biological, chemical/physical, and/or habitat assessments. Drop down boxes are used to minimize typing and the chance for data entry error. Once data is entered, a confirm page allows the data to be verified. At that time changes can be made if necessary, otherwise the data is submitted to the database. If an error in the data is identified at a later date, the monitor notifies IOWATER staff who then make the requested change. Changes to the IOWATER database can only be made by an IOWATER staff person. As a data record is submitted to the IOWATER database, a date/time of data entry is attached to each record.

In addition to water quality data, digital images of monitoring sites can be uploaded to the database. These GIF or JPEG files provide a visual documentation of stream conditions and activities at a monitoring site. The IOWATER monitor provides a title for the photograph, date and time the photograph was taken, who took the photograph, and a description of the photograph. As the saying goes, "a picture is worth a thousand words," especially when recording stream bank conditions, adjacent land use, or canopy cover.

To date, more than 815 sites have been registered; 850 biological, 2,275 chemical/physical, and 620 habitat assessments have been submitted; and 200 photographs uploaded to the IOWATER database. The difference in number of chemical/physical assessments relative to biological or habitat assessments submitted to the IOWATER database is not surprising given the recommended frequency of completing each assessment. Chemical/physical assessment can be completed as often as wanted, whereas biological monitoring should be done no more than three times a year, and the habitat assessment completed once a year unless a major change occurs in the watershed.

Viewing Data

Information in the IOWATER database can be queried in a number of ways including site name, county, or watershed (Figure 2). Once a site is selected, a site log appears that indicates the biological, chemical/physical, and habitat assessments available, as well as photographs. Assessments are listed by the date the assessment occurred, from the most recent to the oldest. If a site has multiple records available for a particular assessment, all records can be viewed at the same time by clicking on the colored header bar. For example, site number 996013 - Bigalk Creek in Winneshiek County has multiple assessment records. To view all of the chemical/physical assessments at the same time, click on the chemical/physical header bar. A window will open that displays all of the chemical/physical assessments submitted for this site. Currently, no graphing tool is available with the IOWATER database. The data can be graphed, however, by copying and pasting it into a spreadsheet program and utilizing available charting or graphing tools in the spreadsheet program.

ArcIMS™ is used to geographically display monitoring sites and access data (Figure 3). ArcIMS™ is an Internet mapping application that allows GIS (Geographic Information System) data to be delivered to an individual's desktop. It allows the user to identify information about different layers of geographically referenced data, such as IOWATER monitoring sites, watersheds, and designated uses for stream segments in Iowa, and to create a map based on the various layers of information one wants displayed. The map of IOWATER sites can be accessed through the IOWATER site or by typing: <http://gsbims.uiowa.edu/website/iowater/>. As one zooms in to an area

of interest by using the “+” button from the toolbar on the left, additional layers of information become visible. The user has the ability to make one layer of information "active," allowing information with that layer to be accessed. For example, make the IOWATER Sites layer active. Select "i" or the Identify button from the toolbar. Click on any IOWATER site. Information for that site appears below the map. In the Detail Information column is a hyperlink that provides a direct link to the water quality data for this site (Figure 3).

ISSUES AND CHALLENGES

During the development of the IOWATER database, a number of issues had to be addressed and challenges overcome.

- The original IOWATER database was created in Access. One of the early problems encountered was the inability of Access to allow multiple users of the database at the same time. To resolve this issue, the database was migrated to an SQL database.
- Internet Explorer and Netscape browsers require different programming. Since the majority of people use Internet Explorer, developers of the IOWATER database decided to program the IOWATER data entry forms and data views for Internet Explorer. Since there are fewer data view files than data entry form files, the data view files were modified for Netscape users. Based on the browser being used, the IOWATER monitor is automatically directed to the appropriate data view files. As time permits, the data entry form files will also be modified for Netscape users. In the interim, if a user does not have Internet Explorer installed, but is running Windows 98 or NT2000, he/she can access *Internet Explorer* by opening My Computer, selecting View, Toolbars, Address Bar, and then type www.iowater.net into the address line.
- Upgrades to Internet Explorer and Netscape have created some minor challenges with the database. With each upgrade, we have had to make minor changes to the programming to accommodate the new browser version. And in some instances, we have recommended not using some versions of the browsers at all.
- The computer programming for the data forms needed to be modified to accommodate MAC users. Most schools in Iowa use MACs, so there was an immediate need to make the IOWATER database accessible to MAC users.
- One of the initial concerns voiced about the online database was whether we would be limiting access to it by those who don't have Internet capability. Most, if not all, public libraries in Iowa have Internet access. If someone does not have a home computer but does want to submit data, we encourage he/she to use a local library, contact the local Natural Resources Conservation Service, Soil and Water Conservation District commissioners, or we will provide the person with the name of another active IOWATER monitor in the area who has Internet access and can help with data submittal.
- Upon completion of an IOWATER workshop, each IOWATER monitor is assigned a unique ID and password. This ID and password provides security to the database and limits data entry to only those who have been certified an IOWATER monitor.
- To accommodate IOWATER monitors who want to share a site, each is given a new ID and password that is used for shared sites.

SUMMARY

The IOWATER database has been an overwhelming success during its first two years online. The database will continue to be dynamic, with new modules added, modifications made at the request of IOWATER monitors, and new tools developed to allow easier access to the data. The developers of the IOWATER database are more than willing to share our lessons learned with other states interested in developing online databases for volunteer data.

REFERENCES

Leopold, Richard, *this volume*, IOWATER, Iowa's Statewide Volunteer Water Quality Monitoring Program, Iowa Department of Natural Resources.

Skopec, Mary, *this volume*, Using Modernized STORET to Create a State -Wide Data Clearinghouse in Iowa, Iowa Department of Natural Resources.

ACKNOWLEDGEMENTS

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Table 1. Estimated cost to develop and maintain the IOWATER online database.

Items to develop database (staff time estimate - \$25/hour)	Estimated Cost
3 full-time staff for 90 days to develop database tables and web interface for Level 1; includes online data submission forms, online site registration form; view data forms (2160 hours)	\$54,000
Password protected database security form – modification of form off the web (5 hours)	\$125
Development of Level 2 online data submission forms and view data forms (40 hours)	\$1,000
Development of Level 2 modules – standing waters, benthic macroinvertebrate indexing, soil (90 hours)	\$2,250
Iowa Geographic Image Map Server used by citizen monitors to identify UTM coordinates of monitoring sites	Priceless
Purchase of SQL server to house the IOWATER database	\$5,000
Purchase of SQL software and associated SQL license (educational version)	\$500
Purchase of web server	\$3,500
Purchase of multiple copies of educational version of Front Page to develop web-based online forms (\$80/license)	\$240
Purchase of ArcIMS software	\$7,500
Development of ArcIMS application for IOWATER (120 hours)	\$3,000
Registration of IOWATER website (www.IOWATER.net)	\$35
One-time installation of IOWATER home page on commercial site	\$75
Initial placement of www.IOWATER.net on commercial site for one year	\$220
Development of Netscape View Option for IOWATER database (20 hours)	\$500
<i>TOTAL</i>	<i>\$77,945</i>
Maintenance to the database	Estimated time for staff
Maintenance to database	1 hour per week
Adding new IOWATER site monitors (# of workshops varies)	1 hour per workshop
Registering new IOWATER monitoring sites (# of sites varies)	0.5 hour per site
Provide training at IOWATER workshops on how to use the database (# of workshops varies)	1 hour per workshop
Development of online field forms for additional modules	30 hours per module
Renewal of IOWATER website name (www.IOWATER.net)	\$55 for 5 years
Maintenance of www.IOWATER.net on commercial site	\$250 per year
Monthly SQL server fee for IOWATER database on a commercial site	\$85 per month

Figure 1. Once an IOWATER monitor registers a site, a drop down box appears that lists the site. A site is selected for data submission. Depending on the level of training completed by the monitor, the appropriate field assessment forms appear.

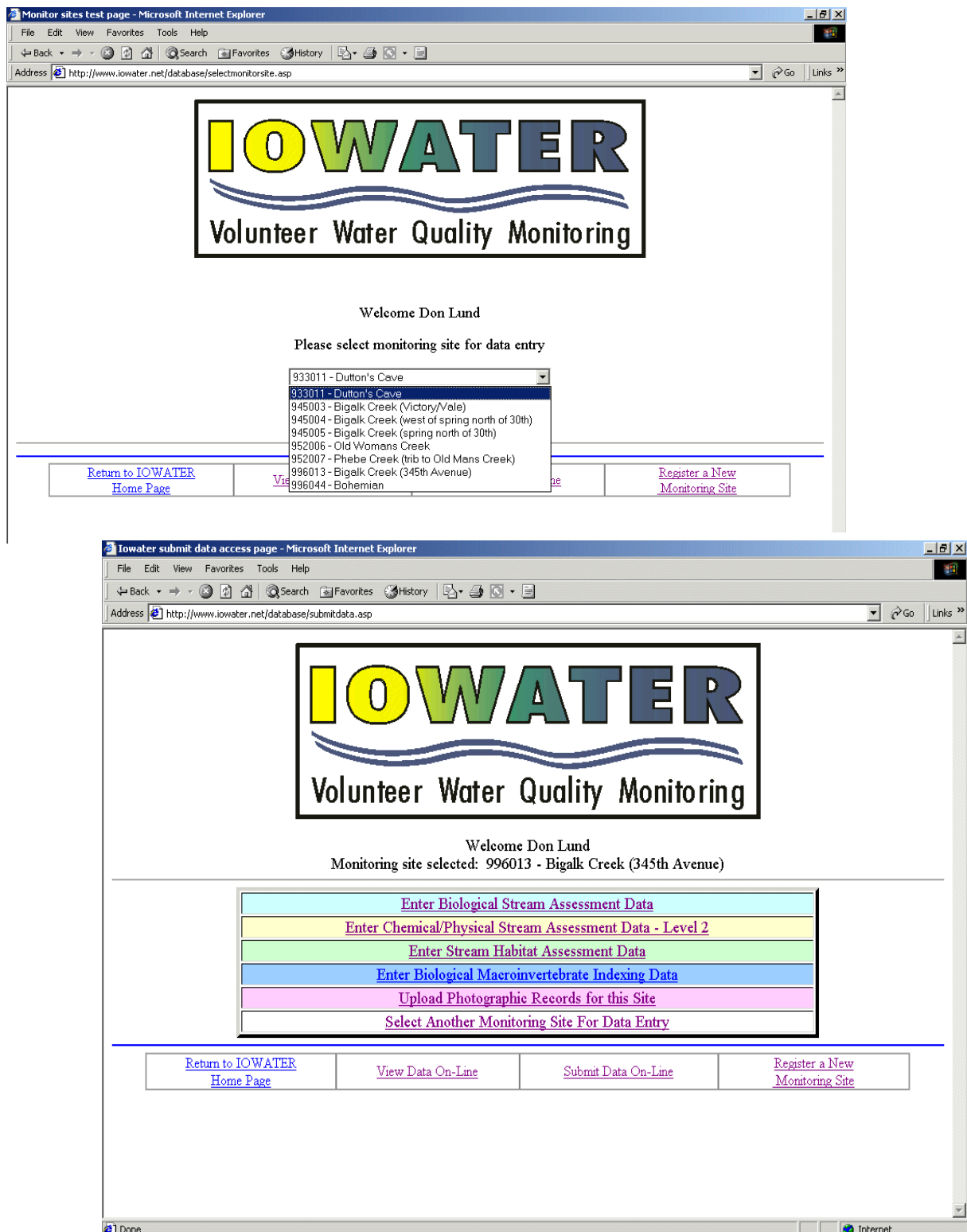


Figure 2. Data in the IOWATER database can be queried by site, county, watershed, or geographically. Each site log lists the data assessments and photographs available for a monitoring site.

IOWATER monitoring sites data view - Microsoft Internet Explorer

Address: <http://www.iowater.net/database/viewdata.asp>

VIEW IOWATER DATA ON-LINE

NOTE: This interactive online database application can best be viewed under *Internet Explorer 5.01 (SP2)* (*Note: IE5.5 has some bugs and may not operate properly*), however *Netscape 4.7* will function properly. For more information on Hydrologic Unit Codes (HUCs), [click here](#).

Select by site: 957011 - Abbe Creek (by school) [Get site](#) [Reset](#)

Select by county: Adams [Get county](#) [Reset](#)

Select by HUC 8: 10170203 - Big Sioux River - Lower [Get HUC 8](#) [Reset](#)

Select by HUC 11: 10230003150 - Arcola Creek [Get HUC 11](#) [Reset](#)

[Search Geographically](#)

To download Internet Explorer 5.01, go to <http://www.microsoft.com/windows/ie/download/ie501sp2.htm> (PC) or <http://www.microsoft.com/mac/products/ie/> (MAC) to download a free copy of the latest version of Internet Explorer, or go to <http://www.netscape.com/computing/download/index.html> to download a free copy of the latest version of Netscape. If you do not have Internet Explorer installed, but are running Windows 98 or NT2000, you can access Internet Explorer by opening My Computer, selecting View, Toolbars, Address Bar, and then type www.iowater.net into the address line.

[Return to IOWATER Home Page](#)
[View Data On-Line](#)
[Submit Data On-Line](#)
[Register a New Monitoring Site](#)

IOWATER Monitoring Site Log for 996013 - Bigalk Creek (345th Avenue) - Microsoft Internet Explorer

IOWATER Monitoring Site Log

[Exit site record](#)

BIOLOGICAL LOG

April 21, 2001 [11:00 am](#)

July 14, 2000 [12:00 pm](#)

CHEMICAL/PHYSICAL LOG

December 20, 2001 [12:00 pm](#)

November 16, 2001 [3:00 pm](#)

August 5, 2001 [11:00 am](#)

June 7, 2001 [6:00 pm](#)

April 21, 2001 [11:00 am](#)

HABITAT LOG

November 16, 2001 [3:00 pm](#)

July 14, 2000 [12:00 pm](#)

BENTHIC MACRO INDEX LOG

No data is currently available.

IOWATER Site Information

Site No.: 996013

Site Name: Bigalk Creek (345th Avenue)

County: Winneshiek

Site type: Stream

Stream name: Bigalks Creek

7.5' Quadrangle: CRESCO NE

Lat: 43.4741 **Long:** -92.0791

UTM_X: 574,483 **UTM_Y:** 4,813,875 **Zone** 15

HUC 8 Watershed: 7060002 - Upper Iowa River

HUC 11 Watershed: 7060002030 - Ten Mile Creek

HUC 14 Watershed:

The daily assessment log files for this site are noted to the left. By clicking on the **time** a window will open with the selected assessment information for that date and time.

By clicking on the colored header bar of the Biological, Chemical/Physical, or Habitat sitelogs, a window will open that will allow you to copy the dataset of the current site for those records and paste into an Excel 2000 spreadsheet. Simply copy all elements in the opened display window and paste into Excel as a paste special choice ([html](#)).

Figure 3. ArcIMS™ is used to geographically display monitoring sites and access data. Users can identify information about different layers of geographically referenced data. The lower map shows the city of Decorah, located in northeast Iowa. The IOWATER Site ID layer is active and the "i" (Identify) button in the toolbar on the left is used to identify an IOWATER site. Information about the site appears below the map, as well as a link to the water quality data for this site.

